

Attorney Docket No.: **NE-0002**  
Inventors: **Borgstahl et al.**  
Serial No.: **10/681,874**  
Filing Date: **October 7, 2003**  
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#### **REMARKS**

Claims 1-9 are pending in the instant application. Claims 1-9 have been rejected. No new matter has been added by this amendment. Reconsideration is respectfully requested in light of the following remarks.

#### **I. Rejection Under 35 U.S.C. §103**

Claims 1, 2, and 4-9 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Bowen et al. (U.S. Patent No. 6,782,076) and further in view of Amelio (U.S. Patent No. 3,866,067) and Atac et al. (U.S. Patent No. 5,978,444). The Examiner acknowledges that Bowen et al. do not disclose the CCD camera with antiblooming circuitry which reduces pixel image corruption due to CCD camera pixel overloading; however, it would have been obvious to one of skill in the art to use the antiblooming circuitry for a CCD as disclosed by Amelio (column 1, lines 5+) to better image resolution. The Examiner further acknowledges that while Bowen et al. are silent to whether the CCD camera converts x-ray signals to electrical signals without the use of phosphor, Atac et al. disclose a direct conversion CCD (column 2, lines 2+).

Claim 3 also remains rejected under 35 U.S.C. 103(a) as being unpatentable over Bowen et al. (U.S. Patent No. 6,782,076) and further in view of Amelio (U.S. Patent No. 3,866,067) and Atac et al. (U.S. Patent No. 5,978,444) as applied to claim 1, and further in view of Chapman et al. (U.S. Patent No. 5,987,095). It is suggested that while Bowen et al. do not teach an x-ray source with a shutter, allowing for variable exposure

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times, that Chapman et al. disclose an x-ray source with a shutter (14).

Applicants respectfully traverse these rejections.

MPEP 2141.02 indicates that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

When considered in its entirety, the primary reference of Bowen et al. teaches a topography imaging system for use in obtaining images of semiconductor materials. Bowen et al. teach that huge gains can be made by relaxing target resolution, and for the inspection and quality control of semiconductor materials, "it is necessary to see isolated dislocations, but not the details of their interactions." In this regard, Bowen et al. indicate that "a resolution of 25  $\mu$ m is ample for this, and indeed up to 100  $\mu$ m could be usable." See column 3, line 53-62.

In contrast, the instant digital topography imaging system is designed to obtain a high resolution, detailed crystalline structure of biological macromolecules such as proteins, DNA and RNA (see claim 9 and Example 2). Applicants have appreciated that to obtain an accurate, detailed image of a very small, highly perfect crystal, x-ray reflection requires the use of a very fine pixel size of *10 micron or smaller* and antiblooming circuitry is necessary due to the very large dynamic range as the profile goes from no diffraction to its peak, e.g., a very bright pixel next to a very dim pixel. See page 7, 19-27.

Although a prior art device may be capable of being modified to run the way the apparatus is claimed, there must be a

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*suggestion or motivation in the reference to do so. 916 F.2d at 682, 16 USPQ2d at 1432.)). MPEP 2143.01. The suggestion or motivation to modify the topography imaging system of Bowen et al., which is used to detect isolated dislocations but not details of semiconductor material, to employ a CCD camera with antiblooming circuitry for better image resolution is simply lacking. Bowen et al. teach relaxing target resolution and resolutions of 25  $\mu\text{m}$  to 100  $\mu\text{m}$ . Bowen et al. do not fairly teach or suggest obtaining *high resolution, detailed images* of less than 10  $\mu\text{m}$  or, as point of fact, *pixel image corruption* as a factor in detecting isolated dislocations in semiconductor material. Therefore one of skill in the art would not look to Amelio for a CCD with antiblooming circuitry to modify the topography imaging system of Bowen et al. for better image resolution because Bowen et al. do not suggest or motivate the skilled artisan to do so.*

Moreover, the cited references do not appear to fairly teach or suggest animating the processed images to show the diffraction of crystal volume versus the oscillation angle in accord with claim 8. In contrast, Applicants demonstrate reconstruction of the physical makeup of the crystal from a series of 2D topographs, wherein background and system noise are removed and colors are assigned for numerical values.

Accordingly, because there is no teaching, suggestion, or motivation for one of skill in the art to substitute the CCD of Bowen et al. with the CCD with antiblooming circuitry of Amelio, these references cannot be held to make obvious the subject matter of claim 1, or claims dependent therefrom, in accord with the requirements set forth under 35 U.S.C. 103(a). It is

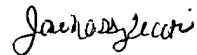
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therefore respectfully requested that the rejection of claims 1-9 under 35 U.S.C. 103(a) be reconsidered and withdrawn.

## **II. Conclusion**

The Applicants believe that the foregoing comprises a full and complete response to the Office Action of record. Accordingly, favorable reconsideration and subsequent allowance of the pending claims is earnestly solicited.

Respectfully submitted,



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